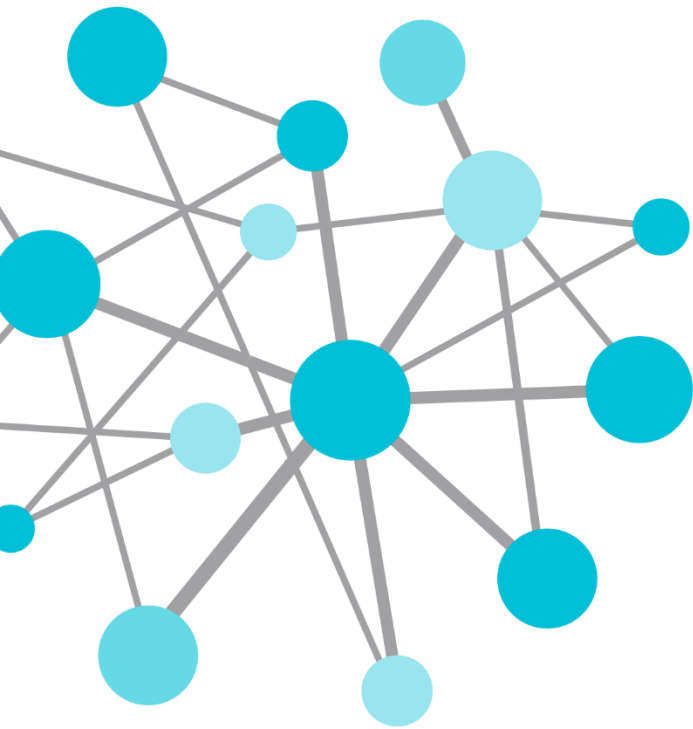


OSIsoft®

REGIONAL SEMINAR 2014

The **Power** of **Data**

DECISION READY IN REAL-TIME



Unleash Your Infrastructure

Presented by **Tom Tunnell, Sr. Systems Engineer**
tunnell@osisoft.com



This Session

Unleash your infrastructure for operational excellence with:

- PI Server 2014
 - PI Asset Framework
 - Calculations and analytics
 - PI Event Frames
 - PI Notifications



In Face of the Data Deluge

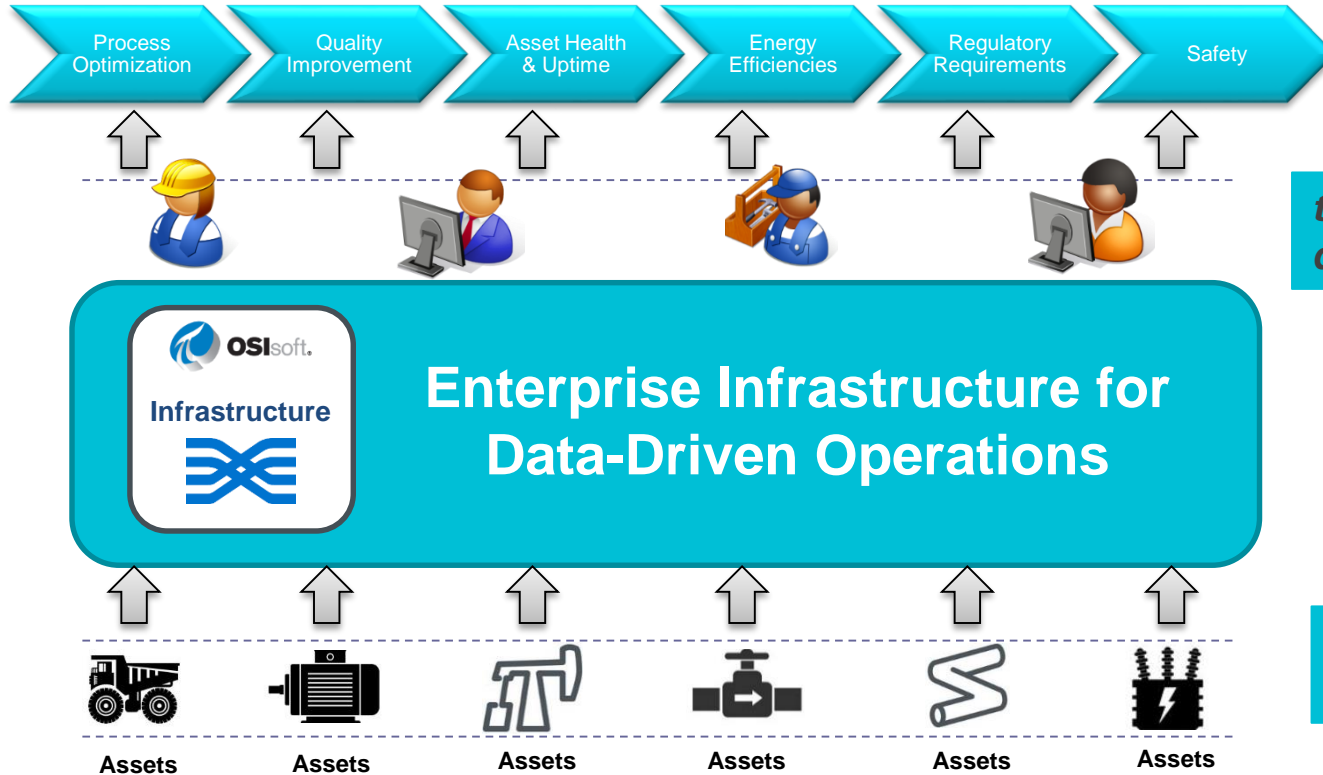
Hundreds of assets

Thousands of events

More people that need to know

*How can you deliver
operational excellence?*

Unleash the PI System Infrastructure



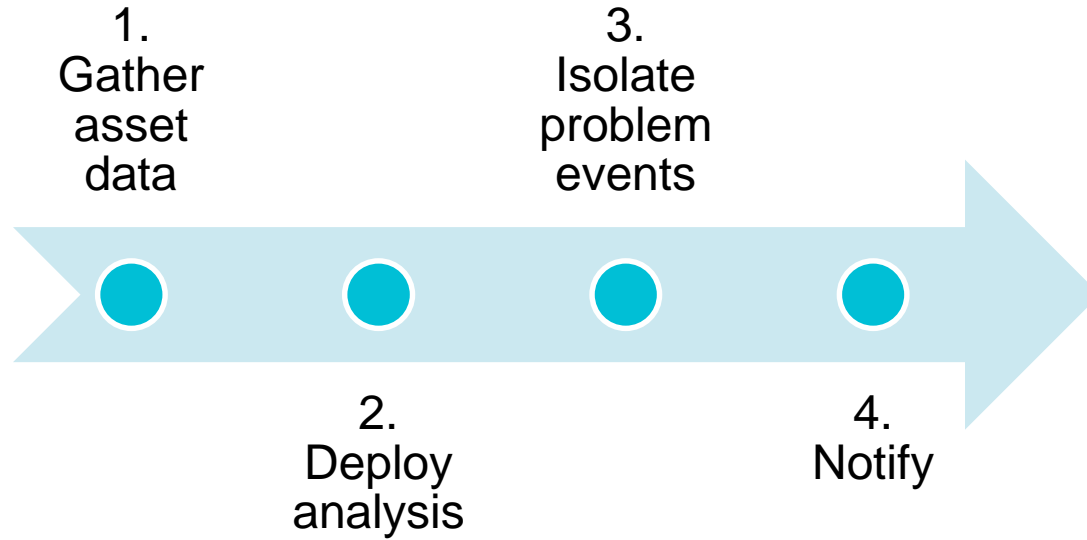
to wherever your data needs to go

Operational Intelligence

Wherever your data resides

Operational Excellence Example

Preventing Failures



Life Before PI Asset Framework

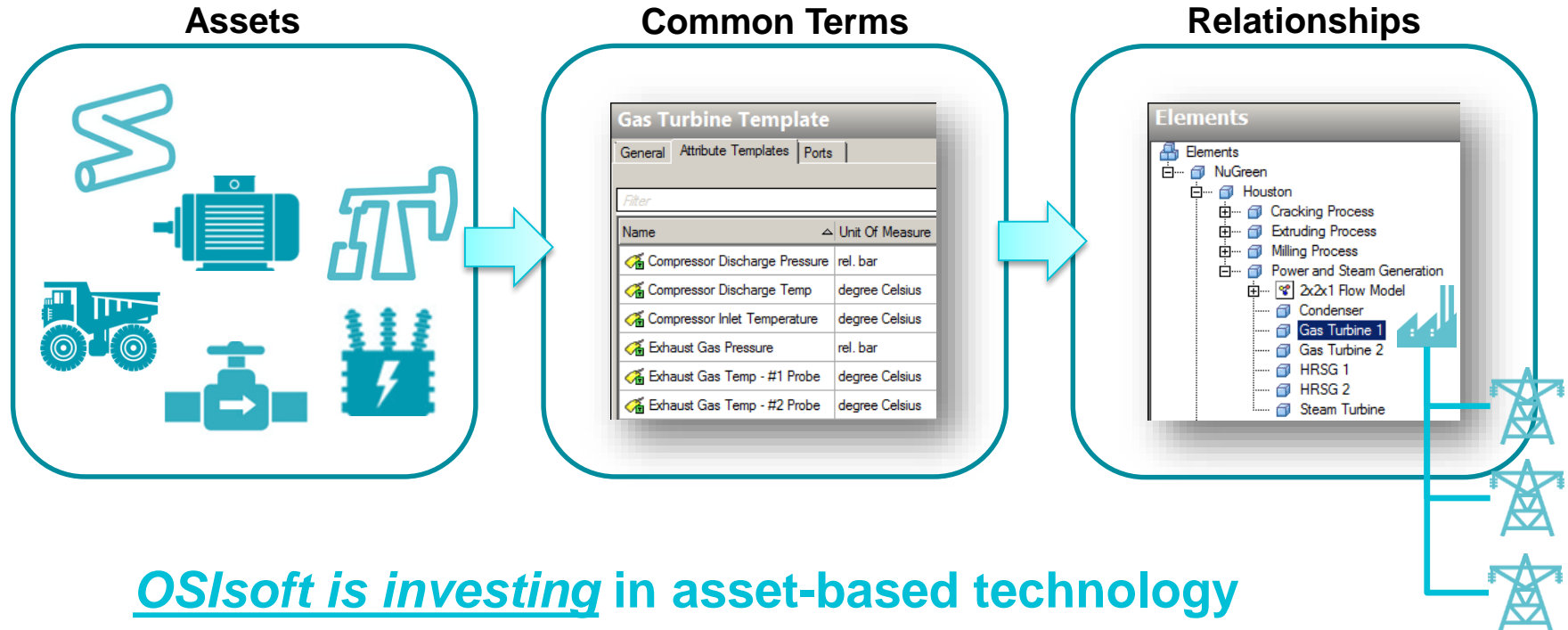
*“In last couple of years, we started to experience a lot of **failures on this device**.*

***We’re not sure why** totally yet [...] we’ve got this problem we don’t have a handle on [...] it could pop up at any moment, and **we don’t have any insight on it**.*

*So I thought **there’s got to be a better way**.”*

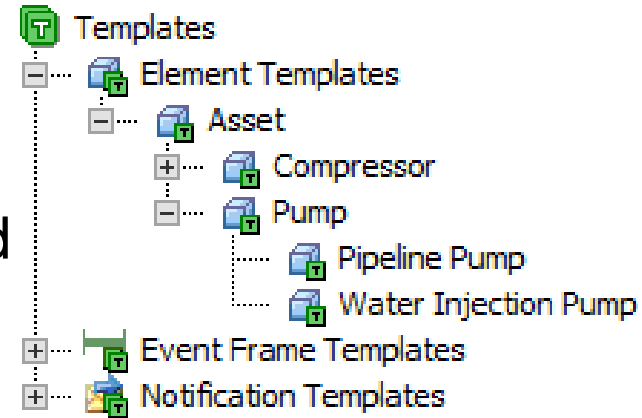


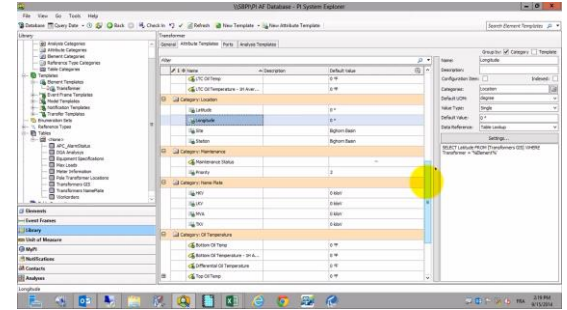
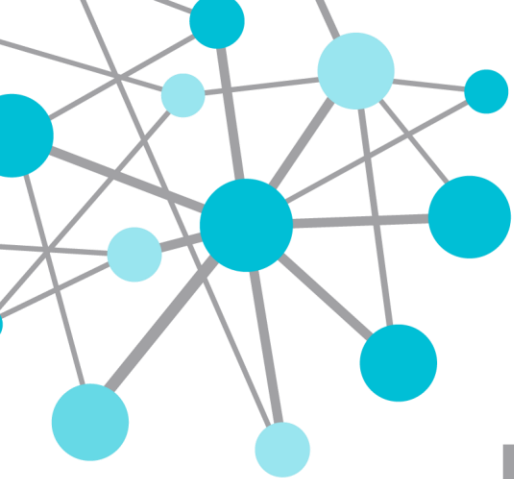
Introducing PI Asset Framework – *Assets in Context*



The Power of Templates

- Reduce **time to deployment**
 - Attributes, KPIs, events, alerts defined
 - Tag creation can be templated
- Facilitate **asset management**
 - Post-modifications are replicated to all assets
 - Create assets in bulk using the PI Builder (MS Excel)
- Reuse **visualization** screens and reports
 - Element-relative visualization for similar assets





DEMO

Preventing Failures Step 1. Gather Your Asset Data

“Started **reviewing failures** from PI data [...]

Some were immediate, others were **showing a type of signature**; rapidly fluctuating voltage. [...]

So I started playing with PI [...] and thought **there's got to be a way to detect when there's deviation in voltage.**”



Introducing Calculations and Analytics



Asset



Analysis



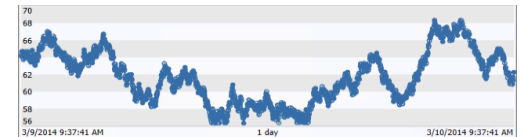
Testing



Execution



PI Tag



Backfill

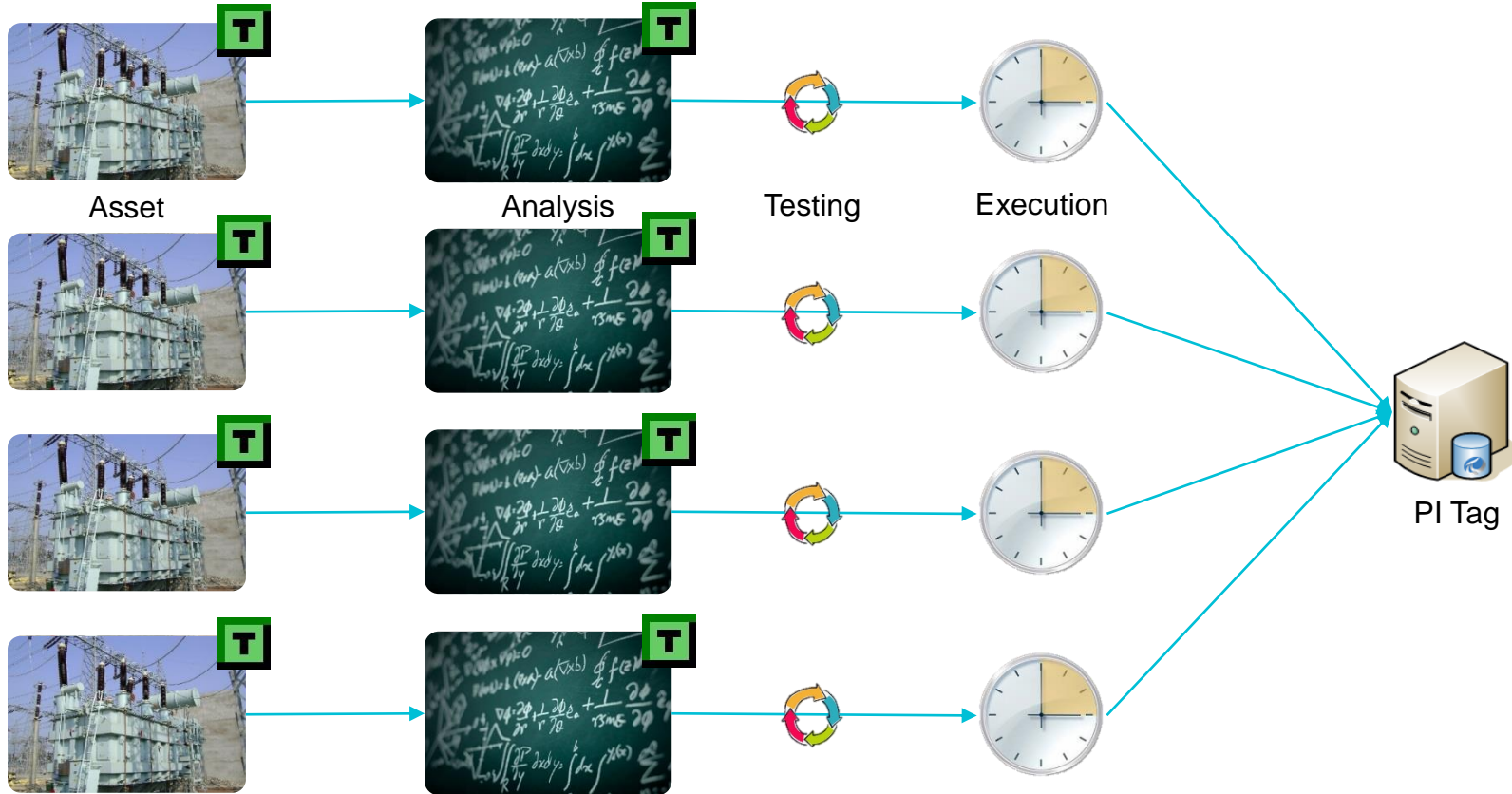
“So I settled on **standard deviation**.

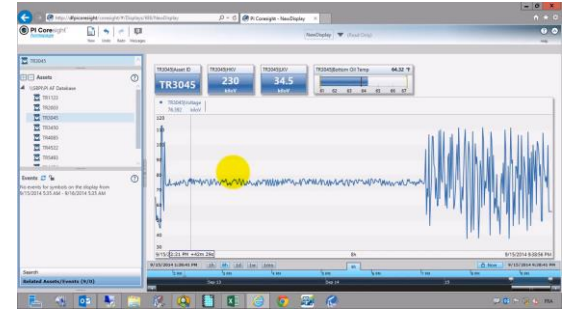
When the voltage is **in the normal mode, std dev stay low** normally, but when we get into rapid fluctuation, **then std dev jumps up**.

But now I have the issue, **we have 255 of these, how do we do it?**”



Calculations and Analytics Continued





DEMO

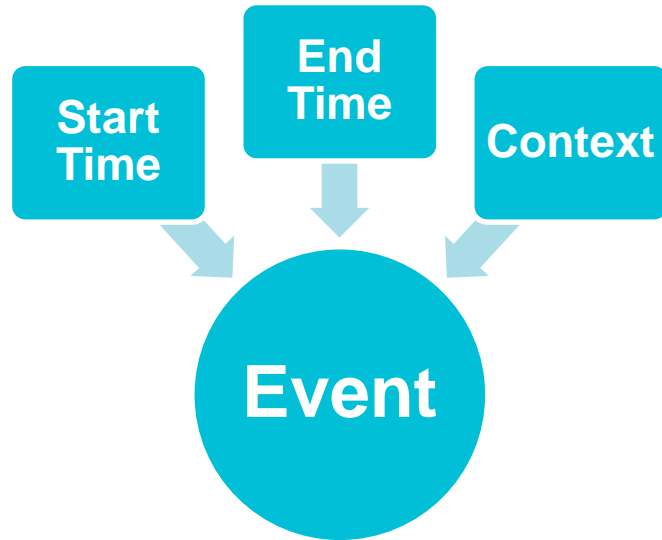
Preventing Failures Step 2. Deploy Your Analysis

*“Within a span of **slightly under 2 weeks**, we had a **diagnostic system deployed** across 255 transformers.*

*Give me a **weekly summary** of which [...] were in alarm, and then detailed alert on **when they went into alarm.**”*



Introducing PI Event Frames



Referenced Elements	Name
	OW-206
	OW-207

Name	Value
Category: General Info	
Comment	
Operator	Bobby Wolf
Phase	Dwell
Type	LOW TEMP
Category: Limits	
Temp.Limit.High	88 deg C
Temp.Limit.Low	70 deg C
Category: Manual Logger	
Comment	
Category: Process Parameters	
Level.Start	42.7438011169434 L
Temp.End	71.1539001464844 deg C
Temp.Max	71.1538996921712 deg C
Temp.Min	62.1662445068359 deg C
Temp.Range	8.98765538533529 deg C
Temp.Start	62.1662445068359 deg C

Asset(s) associated to the event

Text entries useful for filtering/group-by analysis

Placeholders for **manual data entry**

Calculated data using event start & end time context

Weekly Failure Report Example

Copy of Copy of UC2014 Power Gen Reports - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS PI DATALINK PI BUILDER Team

F26

Select a DAY: 2014_01_25 Search Start: 1/10/2014 Search End: 24-Mar-14 14:20:12 Unit Name: Unit 1

(76) Events during DAY ---2014_01_25--- on <<Unit 1>>

GENERAL INFORMATION

DAY NAME: 2014_01_25
 Site: San Leandro Power Plant
 Unit: Unit 1
 Start Time: 25-Jan-14 00:00:00
 End Time: 26-Jan-14 00:00:00
 Duration: 1:00:00:00
 Duration (min): 1440.0
 Day of Week: SATURDAY
 Day Type: WEEKEND
 Element Path: WUCAFS\VR\Power Generation\Generation\OSISoft Power\San Leandro Power Plant\Unit 1

AMBIENT TEMPERATURE

Ambient Temperature.Min: 33.30
 Ambient Temperature.Avg: 36.73
 Ambient Temperature.Max: 40.87

TURBINE OVERVIEW

HP Overall Efficiency.Avg: 0.00
 IP Overall Efficiency.Avg: 0.00

GENERATOR OVERVIEW

Gross MW.Start: 1.57
 Gross MW.End: 1.41
 Gross MW.Min: 1.35
 Gross MW.Avg: 1.52

76 ---2014_01_25--- Events

76 ---2014_01_25--- Events

Events Active In Range

Event Name: []
 Event Category: []
 Event Template: []

Relative Time	Event name	Start tm	End tm	Duration	Event template	Primary element	Site
00--05:05:00	Boiler Feed Pump #1 - Boiler Feed Pump Low Discharge Flow	24-Jan-14 18:55:00	29-Jan-14 21:55:00	5:30:00	Boiler Feed Pump Low Discharge Flow	Boiler Feed Pump #1	San
00--04:05:00	Boiler Feed Pump #1 - Boiler Feed Pump Low Pump Speed	24-Jan-14 19:55:00	29-Jan-14 21:55:00	5:20:00	Boiler Feed Pump Low Pump Speed	Boiler Feed Pump #1	San
00--03:05:00	Boiler Feed Pump #2 - Boiler Feed Pump Low Discharge Flow	24-Jan-14 20:55:00	26-Jan-14 08:50:00	1:11:55:00	Boiler Feed Pump Low Discharge Flow	Boiler Feed Pump #2	San
00--02:45:00	Boiler Feed Pump #1 - Boiler Feed Pump Control Oil Pressure Anomaly	24-Jan-14 21:15:00	25-Jan-14 01:55:00	0:44:00:00	Boiler Feed Pump Control Oil Pressure Anomaly	Boiler Feed Pump #1	San
00--02:30:00	Unit 1 - Unit Trip - 2014 01 24 21	24-Jan-14 21:30:00	31-Jan-14 05:15:00	6:74:50:00	Unit Trip	Unit 1	San
00--01:15:00	Boiler Feed Pump #2 - Boiler Feed Pump Low Pump Speed	24-Jan-14 22:45:00	26-Jan-14 09:15:00	1:10:30:00	Boiler Feed Pump Low Pump Speed	Boiler Feed Pump #2	San
00--00:06:40	Mill 2 - Mill Low Feeder Speed - 2014 01 24 23	24-Jan-14 23:53:20	25-Jan-14 00:01:00	0:07:40:00	Mill Low Feeder Speed	Mill 2	San
00--00:00:00	2014_01_25	25-Jan-14 00:00:00	26-Jan-14 00:00:00	1:00:00:00	Unit Time Day	Unit 1	San
00--00:32:30	Mill 4 - Mill Low Feeder Speed - 2014 01 25 00	25-Jan-14 00:32:30	25-Jan-14 00:42:00	0:09:30:00	Mill Low Feeder Speed	Mill 4	San
00--00:32:50	Mill 1 - Mill Low Feeder Speed - 2014 01 25 00	25-Jan-14 00:32:50	25-Jan-14 01:36:30	1:03:40:00	Mill Low Feeder Speed	Mill 1	San
00--00:34:00	Mill 2 - Mill Low Feeder Speed - 2014 01 25 00	25-Jan-14 00:34:00	25-Jan-14 01:41:20	1:07:20:00	Mill Low Feeder Speed	Mill 2	San
00--01:40:20	Mill 1 - Mill Low Feeder Speed - 2014 01 25 01	25-Jan-14 01:40:20	25-Jan-14 02:22:00	0:41:40:00	Mill Low Feeder Speed	Mill 1	San
00--04:20:20	Mill 1 - Mill Low Feeder Speed - 2014 01 25 04	25-Jan-14 04:20:20	25-Jan-14 04:32:30	0:12:10:00	Mill Low Feeder Speed	Mill 1	San
00--04:34:00	Mill 1 - Mill Low Feeder Speed - 2014 01 25 04	25-Jan-14 04:34:00	25-Jan-14 04:39:30	0:05:30:00	Mill Low Feeder Speed	Mill 1	San
00--04:40:50	Mill 1 - Mill Low Feeder Speed - 2014 01 25 04	25-Jan-14 04:40:50	25-Jan-14 08:03:30	3:22:40:00	Mill Low Feeder Speed	Mill 1	San
00--08:14:00	Mill 1 - Mill Low Feeder Speed - 2014 01 25 08	25-Jan-14 08:14:00	25-Jan-14 08:40:00	0:26:00:00	Mill Low Feeder Speed	Mill 1	San
00--08:46:40	Mill 1 - Mill Low Feeder Speed - 2014 01 25 08	25-Jan-14 08:46:40	25-Jan-14 08:53:50	0:07:10:00	Mill Low Feeder Speed	Mill 1	San
00--09:09:00	Mill 1 - Mill Low Feeder Speed - 2014 01 25 09	25-Jan-14 09:09:00	25-Jan-14 09:14:20	0:05:20:00	Mill Low Feeder Speed	Mill 1	San

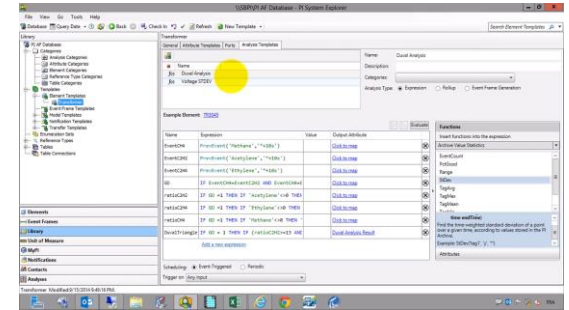
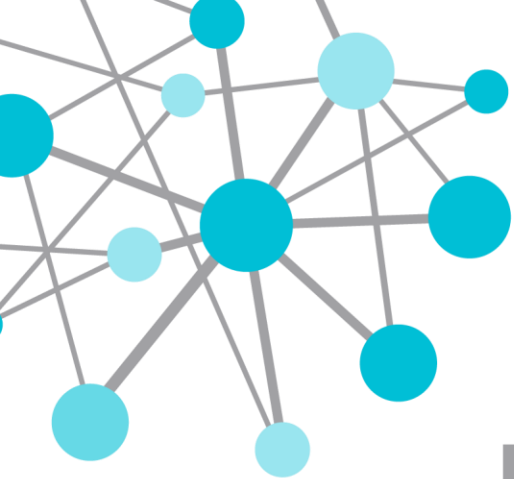
READY 20 OF 77 RECORDS FOUND

7:28 AM 4/1/2014

Weekly Data

Failure Events

Excel Charting



DEEMO

Preventing Failures Step 3. Isolate Problem Events

*“If we detect it, then **notifications** were sent, primarily to the department that I’m in, and we try to validate the data as quickly as we can [...]”*



Introducing PI Notifications



From: PINotAdmin
To: Mariana Sandin
Cc:
Subject: Transformer TR0842 Load is in high alarm

[Instant PI WebParts Trend](#)
[Acknowledge With Comment](#)
[Acknowledge](#)

Name:	Transformer Load - High TR0842
State:	High
Trigger Time:	7/29/2012 9:07:01 AM Pacific Daylight Time (GMT-07:00:00)
Start Time:	7/29/2012 9:07:01 AM Pacific Daylight Time (GMT-07:00:00)
End Time:	1/1/1970 12:00:00 AM Pacific Standard Time (GMT-08:00:00)
Triggering Conditions:	Load > 22
Target:	TR0842

DF PI Notifications
Wind Farm availability is under 70%

Redirect ▾ Ignore



ComEd's Story Unleashed...

Identify Pre-cursor Trends

Build a Sandbox to Identify the Condition

Analyze the Results

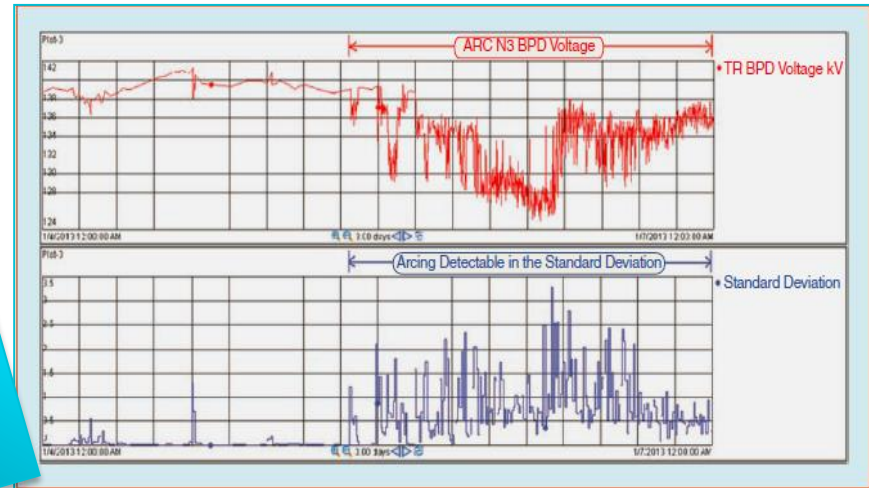
Automate and Improve

Need:

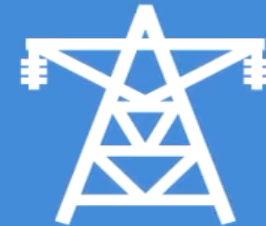
Identify failing bushing pot devices by detecting erratic voltage across electric 255 transformers

From: PI-ACE.BushingPotDeviceNotification.norepl
To: ComEd Bushing Pot Alarm Notification
Cc:
Subject: Bushing Pot Device Alarm - 38TR76 BK

38TR76 BKV = 135.5
38TR76 M = CLOSED-METER
Start Time: 12/13/2013 6:10:00 AM
3 day Stdev = 3.772986
10 min Stdev values for the past hour:
12/13/2013 6:00:00 AM to 12/13/2013 6:10:00 AM = 0.042971
12/13/2013 5:50:00 AM to 12/13/2013 6:00:00 AM = 0.043006
12/13/2013 5:40:00 AM to 12/13/2013 5:50:00 AM = 1.120646
12/13/2013 5:30:00 AM to 12/13/2013 5:40:00 AM = 4.730449
12/13/2013 5:20:00 AM to 12/13/2013 5:30:00 AM = 7.349881
12/13/2013 5:10:00 AM to 12/13/2013 5:20:00 AM = 5.998719



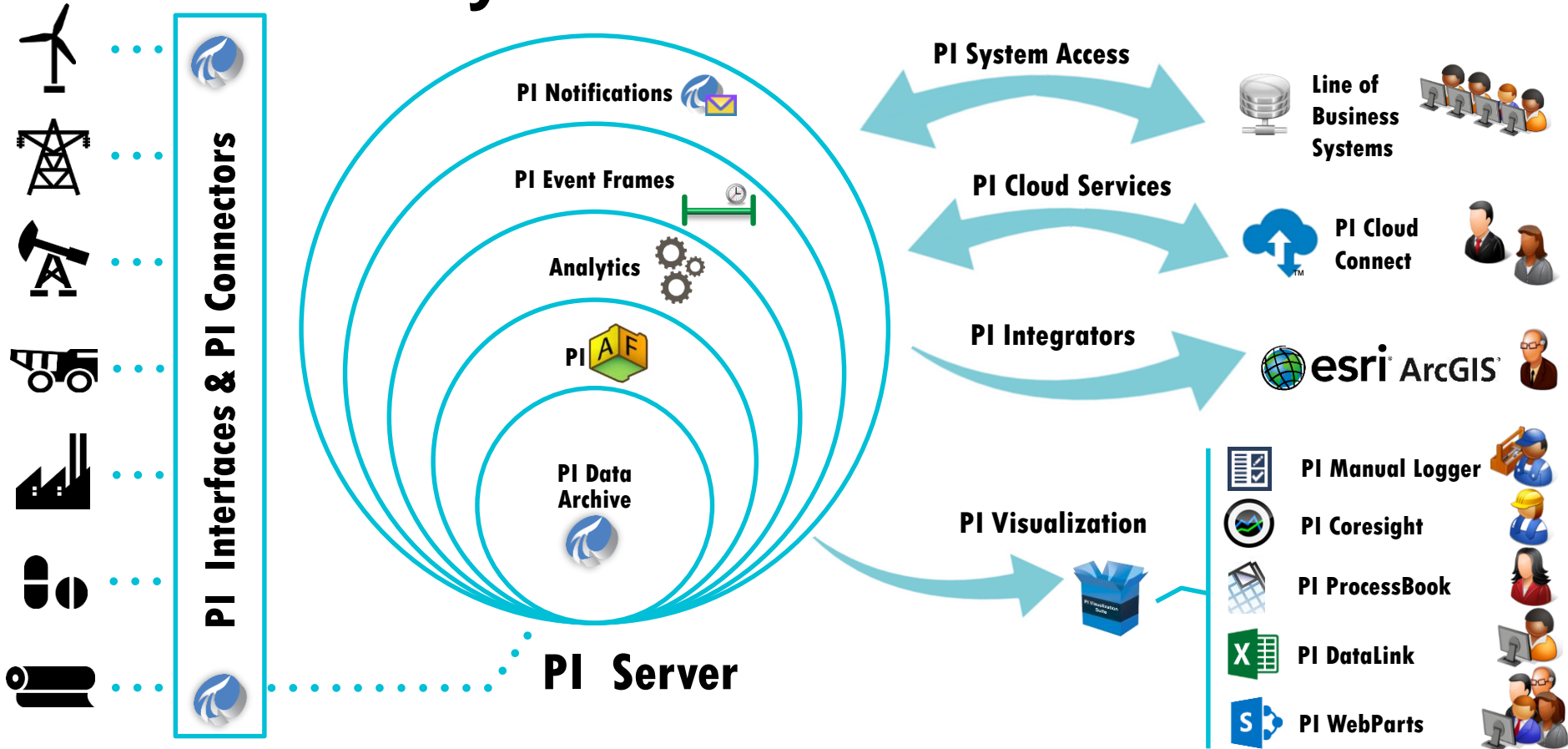
Operation Intelligence:
Prevented several transformer outages by notifying Engineers in time



Trusting the Data: Analytics and Visualization

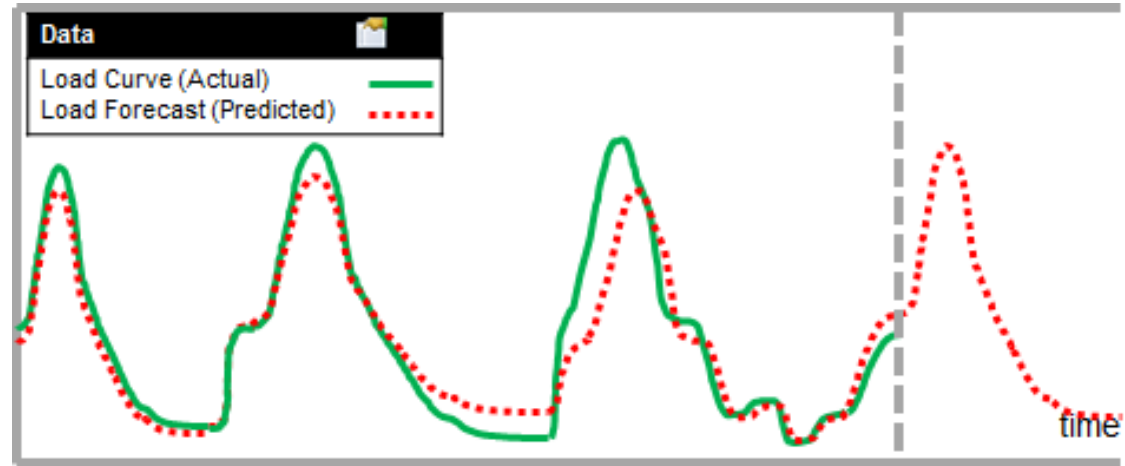
John Juna
ComEd

PI System Infrastructure



PI Data Archive 2015

- Future Data



- PI Batch to PI Event Frames migration

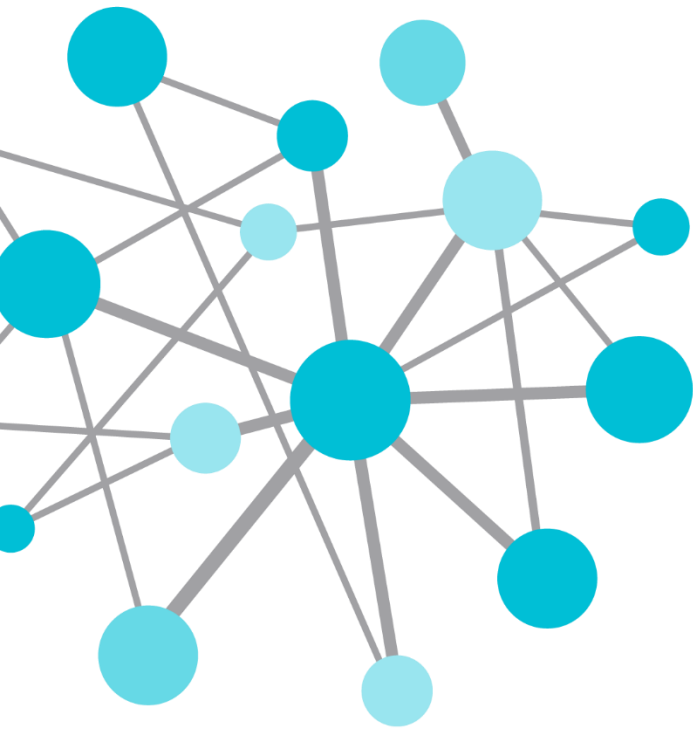
Summary

Unleash your PI System infrastructure with:

- PI AF to enable **asset insights**
- Calculations and analytics to **generate new insights**
- PI Event Frames to **accelerate decision making**
- PI Notifications to **deliver the right information**, at the right time, to the right people



**Operational
Excellence**

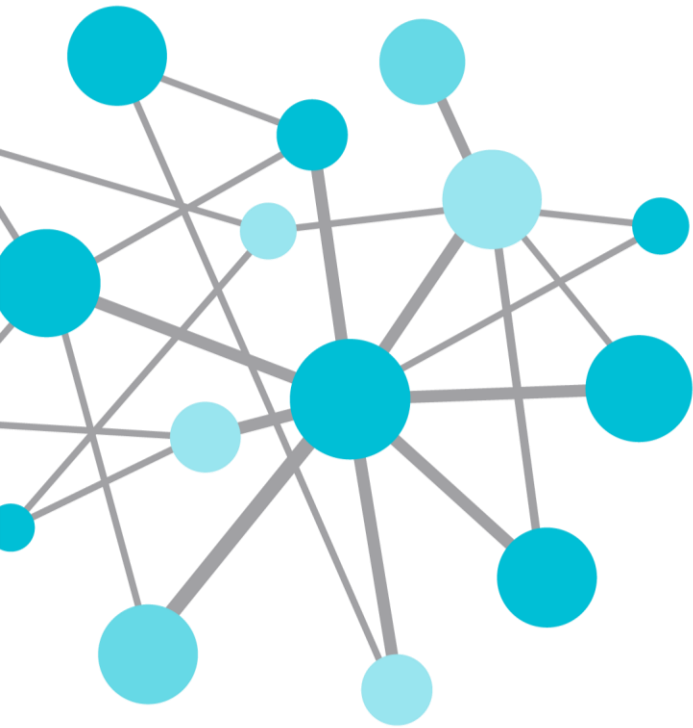


Questions

Please wait for the microphone before asking your question



Please state your name
and your company



THANK
YOU

Brought to you by  **OSIsoft.**

Tom Tunnell

Sr. Systems Engineer

tunnell@osisoft.com

OSIsoft, LLC